6.2 The Human Digestive System

In this section, you will:

- Identify the main structures and functions of the digestive system
- Describe the physical and chemical processing of food through the digestive system and into the bloodstream
- Explain the action of enzymes in chemical digestion
- Identify and describe, in general terms, how digested molecules enter the bloodstream

The Digestive System

- Eat It – Weird Al
Functions of Digestion

1. Ingestion
2. Digestion
3. Absorption
4. Egestion

The Mouth

- Mechanical Digestion:
  - Chewing (teeth, tongue) = ?
- How does this help chemical digestion?
- Chemical Digestion:

Taste

- Taste buds contain chemoreceptors that send signals to the brain.
- We do not taste when we are unable to smell
- Water, mucus, and saliva all help activate our taste buds
Secretions of the Digestive Tract

<table>
<thead>
<tr>
<th>Secretion</th>
<th>Site of production</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>saliva</td>
<td>mouth</td>
<td>contributes to starch digestion via salivary amylase; lubricates the inside of the mouth to assist in swallowing</td>
</tr>
<tr>
<td>mucus</td>
<td>mouth, stomach, small intestine, and large intestine</td>
<td>protects the cells lining the innermost portion of the digestive tract; lubricates food as it travels through the digestive tract</td>
</tr>
<tr>
<td>enzymes</td>
<td>mouth, stomach, small intestine, and pancreas</td>
<td>promote digestion of food masses into particles small enough for absorption into the bloodstream</td>
</tr>
<tr>
<td>acid</td>
<td>stomach</td>
<td>promotes digestion of protein</td>
</tr>
<tr>
<td>bile</td>
<td>liver (stored in gall bladder)</td>
<td>suspends fat in water, using bile salts, cholesterol, and lecithin to aid digestion of fats in small intestine</td>
</tr>
<tr>
<td>bicarbonate</td>
<td>pancreas and small intestine</td>
<td>neutralizes stomach acid when it reaches the small intestine</td>
</tr>
<tr>
<td>hormones</td>
<td>stomach, small intestine, and pancreas</td>
<td>stimulates production and/or release of acid, enzymes, bile, and bicarbonate; help to regulate peristalsis</td>
</tr>
</tbody>
</table>

The Mouth to the Esophagus

- Smell or taste triggers three pairs of salivary glands
- Chemical digestion starts in the mouth – salivary amylase beings to break down starches
  - Hydrolysis
- Physical digestion also begins in the mouth
  - Chewing
  - Peristalsis
  - Churning
- As you chew the food is turned into a lump like mass (bolus)
- The bolus enters the esophagus which moves it to the stomach through peristalsis

Esophagus

- Muscular portion of digestive tract
- Directs food from mouth to stomach
- Bolus moves down by gravity and through series of wavelike muscular contractions.
Activity 1
• 3 volunteers

Peristalsis:
Enter to the stomach is controlled by the esophageal sphincter

Activity 2
• Form groups of 3-4 members

Esophageal Sphincter
• Ring of muscles
• Closes off top part of stomach
• Acts to prevents stomach acid and food from backing up into esophagus.
The Stomach

- Responsible for storing, digesting and moving food into the small intestine.
- Can hold up to 2-4L of food
- J-shaped organ, lined with muscle
- The pyloric sphincter controls the exit of the stomach's contents
- Physical and chemical digestion occur to produce Chyme
- Little absorption happens here besides some small amount of salt and water

How Does the Stomach not Digest Itself?

- Three reasons:
  1. Only secretes gastric juice when food is present
  2. Some stomach cells secrete mucus
  3. Produces pepsin – which is a protein digesting enzyme that remains inactive unless HCl is present

Homework

- Section 6.2 Review
- Pg. 231 # 2, 3, & 5